

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. An engine or pump comprising at least one toroidal cylinder, two impellers with radial vanes rotatably mounted in said cylinder with said impellers cooperating with said cylinder to define working chambers between adjacent vanes, each impeller including to one side thereof at least one rotary valve element which rotates with the impeller and selectively opens and closes passages in said cylinder housing to said working chambers for inletting and exhausting a working media; said rotary valve elements cooperating with said housing such that the position of said valve element defines media flow through said engine or pump.

2. An engine or pump as claimed in claim 1 including a drive train having at least two elliptical gears controlling said impellers and wherein each elliptical gear rotates around a focal point and where gear parameters are defined as function of minimum vane opening allowing formation of four chambers in each toroidal cylinder.

3. An engine or pump as claimed in claim 1 and 2 wherein each impeller has two diagonally opposed radial vanes which rotate within a toroidal cylinder of said housing with said four working chambers being defined between said vanes.

4. An engine or pump as claimed in claim 1 to 3 wherein each valve element includes two outwardly extending nodes that cooperate with a valve portion of said housing, said nodes closing ports in said housing to said working chambers as a function of the angular position of said valve elements.

5. An engine or pump as claimed in claim 1 to 3 wherein each valve element has a series of arcuate passages which connect said working chambers with ports in said housing to selectively open and close ports in said housing to said working chambers, each arcuate media passage including a port adjacent a vane of said engine or pump.

6. An engine or pump assembly comprising at least two toroidal cylinders interconnected by a common drive train; each toroidal cylinder having a pair of rotating impellers; each impeller having two diagonally opposed vanes cooperating with vanes of the other impeller to define four working chambers which change in volume as the vanes rotate in said toroidal cylinder; said impellers of each combustion unit being driven by a corresponding part of gear train for controlling the vane movement as a function of the position in said toroidal cylinder with said gear trains of several toroidal cylinders being interconnected to form common drive train; said drive train controlling the relative position of the impellers of those cylinders and thereby determine the relative position of said vanes and wherein said units cooperate by being out of phase with each other in a manner to reduce output variation by complementing each other.

7. An engine as claimed in claim 6 using one toroidal cylinder as a compressor unit driven by said common drive train and providing compressed media to said working chambers of other toroidal cylinders used as combustion units.

8. An engine or pump assembly as claimed in claim 6 wherein said drive train includes at least 6 elliptical gears synchronizing vane positions in two toroidal cylinders, said at least 6 elliptical gears including 3 gears in mesh for one pair of vanes of one unit and one pair of vanes of the other unit, and a further 3 gears in mesh

for a second pair of vanes in the one unit and a second pair of vanes of the other unit.

9. An engine or pump as claimed in claim 8 wherein each elliptical gear rotates around focal point and where gear parameters are defined as function of minimum vane opening allowing a formulation of four chambers in each toroidal cylinder positioned planetary to input/output shaft of said drive train.